

the condition of education 2006



INDICATOR 13

Mathematics Performance of Students in Grades 4 and 8

The indicator and corresponding tables are taken directly from *The Condition of Education 2006*. Therefore, the page numbers may not be sequential.

Additional information about the survey data and supplementary notes can be found in the full report. For a copy of *The Condition of Education 2006*, visit the NCES website (<http://nces.ed.gov/pubsearch/pubsinfo.sap?pubid=2006071>) or contact ED PUBs at 1-877-4ED-PUBS.

Suggested Citation:

U.S. Department of Education, National Center for Education Statistics. (2006). *The Condition of Education 2006*, NCES 2006-071, Washington, DC: U.S. Government Printing Office.



Academic Outcomes

Mathematics Performance of Students in Grades 4 and 8

The mathematics performance of 4th- and 8th-graders improved steadily from 1990 to 2005. For both grades, the average score in 2005 was higher than in all previous assessments.

The National Assessment of Educational Progress (NAEP) has assessed the mathematics abilities of students in grades 4, 8, and 12 in public and private schools since 1990.¹ In 2005, the national average mathematics scores of 4th- and 8th-graders were higher than in all previous assessments (see supplemental table 13-1). Reported on a 0–500 scale, between 1990 and 2005, the average score of 4th-graders increased 25 points, from 213 to 238, and the average score of 8th-graders increased 16 points, from 263 to 279.

The percentages of students at each achievement level (*Basic*, *Proficient*, and *Advanced*), which identifies what students should know and be able to do at each grade, were also higher in 2005 than in all previous assessments. The percentage of students at or above *Proficient* (indicating solid academic performance) increased from 13 to 36 percent during this period in grade 4 and from 15 to 30 percent in grade 8. The percentage of students at or above *Basic* (indicating partial mastery of fundamental skills) increased from 50 to 80 percent in

grade 4 and from 52 to 69 percent in grade 8 (see supplemental table 13-2).

Certain subgroups of both 4th- and 8th-graders outperformed others in mathematics in 2005. For example, males outperformed females in 2005 (see supplemental table 13-3). White and Asian/Pacific Islander students had higher average scores than their Black, Hispanic, or American Indian peers in 2005. White, Black, and Hispanic scores increased between 1990 and 2005.

NAEP results also permit state-level comparisons of the abilities of 4th- and 8th-graders in public schools. The average mathematics score of all 42 states that participated in 4th grade in 1992 and 2005 increased, with increases ranging from 9 points in Maine to 28 points in North Carolina (see supplemental table 13-4). Similarly, among 8th-graders, the average score increased for all 38 states that participated in 1990 and 2005, with increases ranging from 6 points in Iowa, Montana, and North Dakota to 31 points in North Carolina.

¹ The 2005 National Assessment of Educational Progress (NAEP) assessment included a 12th-grade component, but at the time of this analysis, these data were not available.

² Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

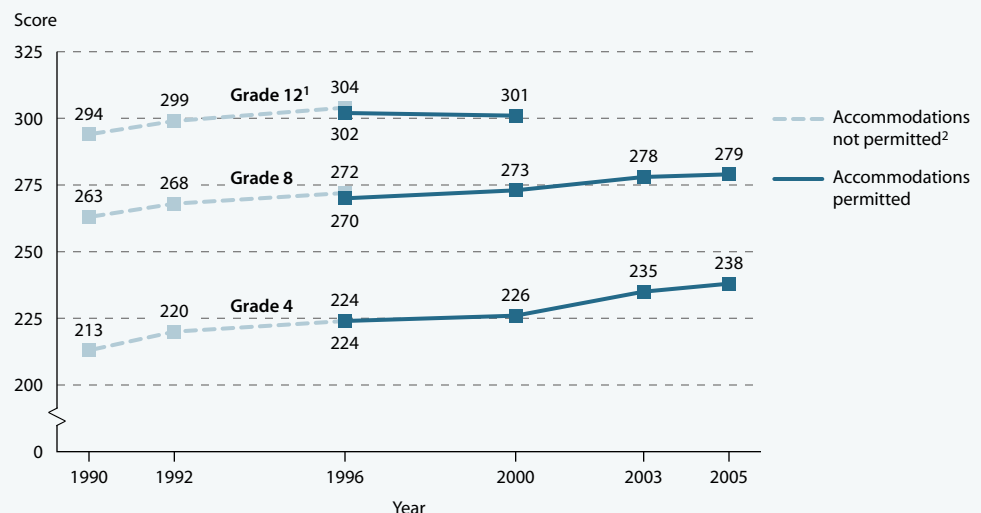
NOTE: Beginning in 2003, the NAEP national sample was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. See *supplemental note 4* for more information on testing accommodations, achievement levels, and NAEP.

SOURCE: Perie, M., Grigg, W.S., and Dion, G.S. (2005). *The Nation's Report Card: Mathematics 2005* (NCES 2006-453), figure 1. Data from U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2005 Mathematics Assessments.



FOR MORE INFORMATION:
Supplemental Notes 1, 4
Supplemental Tables 13-1,
13-2, 13-3, 13-4

MATHEMATICS PERFORMANCE: Average mathematics scores for 4th-, 8th-, and 12th-graders: Various years, 1990–2005



Mathematics Performance of Students in Grades 4 and 8

Table 13-1. Average mathematics score, by grade and percentile: Various years, 1990–2005

Grade and percentile	1990 ¹	1992 ¹	1996 ¹	1996	2000	2003	2005
Grade 4	213	220	224	224	226	235	238
Standard deviation ²	32	32	31	31	31	28	28
Grade 8	263	268	272	270	273	278	279
Standard deviation ²	36	36	36	37	38	36	36
Grade 12	294	299	304	302	301	—	—
Standard deviation ²	36	34	32	34	35	—	—
Percentile ³							
Grade 4							
10th	171	177	182	182	184	197	200
25th	193	199	204	203	205	216	220
50th	214	221	226	225	227	236	239
75th	235	242	246	245	248	255	258
90th	253	259	262	262	265	270	273
Grade 8							
10th	215	221	224	221	223	230	231
25th	239	243	248	245	249	254	255
50th	264	269	273	273	275	279	280
75th	288	294	298	297	300	303	304
90th	307	315	317	316	320	323	324
Grade 12							
10th	247	254	261	257	255	—	—
25th	270	276	282	279	277	—	—
50th	296	301	305	302	302	—	—
75th	319	324	327	326	326	—	—
90th	339	343	345	344	346	—	—

— Not available.

¹ Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

² The standard deviation measures the spread of a set of data around the mean of the data. In a normal distribution, approximately 68 percent of scores fall within plus or minus one standard deviation of the mean, and 95 percent fall within plus or minus two standard deviations of the mean.

³ A percentile indicates the percentage of students whose scores fell at or below a particular score. Thus the 10th and 25th percentiles represent lower scoring students; the 50th percentile represents middle-scoring students; and the 75th and 90th percentiles represent higher scoring students.

NOTE: The 2005 National Assessment of Educational Progress (NAEP) assessment included a 12th-grade component, but at the time of this analysis, these data were not available. Beginning in 2003, the NAEP national sample was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. See *supplemental note 4* for more information on testing accommodations and NAEP.

SOURCE: Perie, M., Grigg, W.S., and Dion, G.S. (2005). *The Nation's Report Card: Mathematics 2005* (NCES 2006-453), figures 1 and 10 and previously unpublished tabulation (November 2005). Data from U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2005 Mathematics Assessments.

Mathematics Performance of Students in Grades 4 and 8

Table 13-2. Percentage of students at each mathematics achievement level, by grade: Various years, 1990–2005

Grade and achievement level	1990 ¹	1992 ¹	1996 ¹	1996	2000	2003	2005
Grade 4							
Below Basic	50.1	41.1	35.8	36.7	34.5	22.8	19.7
At or above Basic	49.9	58.9	64.2	63.3	65.5	77.2	80.3
At or above Proficient	12.7	17.9	21.3	20.8	23.8	32.5	36.3
At Advanced	1.2	1.7	2.3	2.2	2.5	3.9	5.0
Grade 8							
Below Basic	48.2	42.5	37.6	39.0	36.6	31.9	30.9
At or above Basic	51.8	57.5	62.4	61.0	63.4	68.1	69.1
At or above Proficient	15.3	20.9	23.8	23.3	25.7	28.8	29.8
At Advanced	2.0	3.1	3.8	3.7	4.7	5.4	6.0
Grade 12							
Below Basic	41.9	36.3	30.8	34.2	35.0	—	—
At or above Basic	58.1	63.7	69.2	65.8	65.0	—	—
At or above Proficient	11.9	14.7	16.3	16.0	16.8	—	—
At Advanced	1.4	1.6	1.9	2.0	2.3	—	—

— Not available.

¹ Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

NOTE: The 2005 National Assessment of Educational Progress (NAEP) assessment included a 12th-grade component, but at the time of this analysis, these data were not available. Beginning in 2003, the NAEP national sample was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. See *supplemental note 4* for more information on testing accommodations, achievement levels, and NAEP.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2005 Mathematics Assessments, previously unpublished tabulation (November 2005).

Mathematics Performance of Students in Grades 4 and 8

Table 13-3. Average mathematics score for 4th- and 8th-graders, by selected student and school characteristics: 1990 and 2005

Student or school characteristic	Grade 4		Grade 8	
	1990 ¹	2005	1990 ¹	2005
Total	213	238	263	279
Sex				
Male	214	239	263	280
Female	213	237	262	278
Race/ethnicity ²				
White	220	246	270	289
Black	188	220	237	255
Hispanic	200	226	246	262
Asian/Pacific Islander	‡	251	‡	295
American Indian	‡	226	‡	264
Parents' education				
Less than high school	—	—	242	259
High school diploma or equivalent	—	—	255	267
Some college	—	—	267	280
Bachelor's degree or higher	—	—	274	290
Location				
Central city	—	233	—	273
Urban fringe/large town	—	241	—	283
Rural/small town	—	238	—	279
Students in school eligible for free or reduced-price lunch				
10 percent or less	—	254	—	298
11–25 percent	—	247	—	289
26–50 percent	—	240	—	280
51–75 percent	—	232	—	268
More than 75 percent	—	220	—	254

— Not available.

‡ Reporting standards not met (too few cases).

¹ Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

² American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

NOTE: The 2005 National Assessment of Educational Progress (NAEP) assessment included a 12th-grade component, but at the time of this analysis, these data were not available. Beginning in 2003, the NAEP national sample was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. See *supplemental note 4* for more information on testing accommodations and NAEP.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990 and 2005 Mathematics Assessments, previously unpublished tabulation (November 2005).

Mathematics Performance of Students in Grades 4 and 8

Table 13-4. Average mathematics score for public school 4th- and 8th-graders and change in score since 1992 and 1990, by state: 2005

State	Grade 4		Grade 8	
	Average score in 2005	Change from 1992 ¹ average score	Average score in 2005	Change from 1990 ¹ average score
United States	237	19*	278	16*
Alabama	225	17*	262	9*
Alaska	236	—	279	—
Arizona	230	15*	274	15*
Arkansas	236	25*	272	15*
California	230	22*	269	12*
Colorado	239	18*	281	13*
Connecticut	242	15*	281	11*
Delaware	240	22*	281	20*
District of Columbia	211	19*	245	14*
Florida	239	25*	274	19*
Georgia	234	18*	272	13*
Hawaii	230	16*	266	15*
Idaho	242	20*	281	10*
Illinois	233	—	278	17*
Indiana	240	19*	282	14*
Iowa	240	10*	284	6*
Kansas	246	—	284	—
Kentucky	231	16*	274	17*
Louisiana	230	26*	268	21*
Maine	241	9*	281	—
Maryland	238	21*	278	17*
Massachusetts	247	21*	292	—
Michigan	238	18*	277	13*
Minnesota	246	17*	290	15*
Mississippi	227	25*	262	—
Missouri	235	13*	276	—
Montana	241	—	286	6*
Nebraska	238	12*	284	8*
Nevada	230	—	270	—
New Hampshire	246	16*	285	12*
New Jersey	244	17*	284	14*
New Mexico	224	11*	263	7*
New York	238	20*	280	19*
North Carolina	241	28*	282	31*
North Dakota	243	14*	287	6*
Ohio	242	23*	283	19*
Oklahoma	234	14*	271	8*
Oregon	238	—	282	11*
Pennsylvania	241	16*	281	14*
Rhode Island	233	18*	272	12*
South Carolina	238	26*	281	—

See notes at end of table.

Mathematics Performance of Students in Grades 4 and 8

Table 13-4. Average mathematics score for public school 4th- and 8th-graders and change in score since 1992 and 1990, by state: 2005—Continued

State	Grade 4		Grade 8	
	Average score in 2005	Change from 1992 ¹ average score	Average score in 2005	Change from 1990 ¹ average score
South Dakota	242	—	287	—
Tennessee	232	21*	271	—
Texas	242	24*	281	23*
Utah	239	15*	279	—
Vermont	244	—	287	—
Virginia	240	20*	284	20*
Washington	242	—	285	—
West Virginia	231	16*	269	13*
Wisconsin	241	12*	285	10*
Wyoming	243	18*	282	10*

— Not available (state did not participate in earlier assessment).

* Change in score is statistically significant ($p < .05$).

¹ 1992 was the first year for state-level data in grade 4, and 1990 was the first year for state-level data in grade 8. Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted on the 1990 and 1992 mathematics assessments.

NOTE: At the state level, the National Assessment of Educational Progress (NAEP) includes only students in public schools, while other reported national results in this indicator include both public and private school students. Variations or changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples may affect comparative performance results. Beginning in 2003, the NAEP national sample was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. Differences are based upon unrounded estimates. See *supplemental note 4* for more information on testing accommodations and NAEP.

SOURCE: Perie, M., Grigg, W.S., and Dion, G.S. (2005). *The Nation's Report Card: Mathematics 2005* (NCES 2006-453), tables 3 and 4 and previously unpublished tabulation (November 2005). Data from U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 1990, 1992, and 2005 Mathematics Assessments.

Mathematics Performance of Students in Grades 4 and 8

Table S13. Standard errors for the average mathematics scores for 4th-, 8th-, and 12th-graders: Various years, 1990–2005

Grade	1990 ¹	1992 ¹	1996 ¹	1996	2000	2003	2005
Grade 4	0.9	0.7	0.9	1.0	0.9	0.2	0.1
Grade 8	1.3	0.9	1.1	0.9	0.8	0.3	0.2
Grade 12	1.1	0.9	1.0	1.0	0.9	†	†

† Not applicable.

¹ Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2005 Mathematics Assessments, previously unpublished tabulation (November 2005).

Mathematics Performance of Students in Grades 4 and 8

Table S13-1. Standard errors for the average mathematics score, by grade and percentile: Various years, 1990–2005

Grade and percentile	1990 ¹	1992 ¹	1996 ¹	1996	2000	2003	2005
Grade 4	0.9	0.7	0.9	1.0	0.9	0.2	0.1
Standard deviation	0.7	0.4	0.6	0.5	0.4	0.1	0.1
Grade 8	1.3	0.9	1.1	0.9	0.8	0.3	0.2
Standard deviation	0.8	0.4	0.6	0.6	0.5	0.1	0.1
Grade 12	1.1	0.9	1.0	1.0	0.9	†	†
Standard deviation	0.6	0.4	0.5	0.4	0.5	†	†
Percentile							
Grade 4							
10th	2.1	0.9	1.2	1.3	1.2	0.3	0.2
25th	1.0	1.3	1.3	1.8	1.0	0.4	0.2
50th	1.3	1.0	1.0	1.0	1.3	0.3	0.2
75th	1.0	1.0	0.7	0.9	1.1	0.2	0.2
90th	1.6	0.9	1.2	1.2	1.1	0.3	0.2
Grade 8							
10th	2.3	0.9	1.9	1.7	1.7	0.6	0.3
25th	1.5	0.9	1.5	1.2	0.9	0.4	0.2
50th	1.4	1.7	1.1	0.8	1.0	0.3	0.2
75th	1.3	0.8	1.6	1.2	0.7	0.3	0.2
90th	2.2	1.1	1.2	1.2	1.0	0.4	0.3
Grade 12							
10th	1.0	1.3	1.1	1.5	1.3	†	†
25th	1.3	1.5	1.4	1.2	1.0	†	†
50th	1.7	1.2	1.2	1.4	0.8	†	†
75th	1.4	1.4	1.3	1.5	1.0	†	†
90th	1.6	0.8	1.3	1.1	1.4	†	†

† Not applicable.

¹ Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2005 Mathematics Assessments, previously unpublished tabulation (November 2005).

Mathematics Performance of Students in Grades 4 and 8

Table S13-2. Standard errors for the percentage of students at each mathematics achievement level, by grade: Various years, 1990–2005

Grade and achievement level	1990 ¹	1992 ¹	1996 ¹	1996	2000	2003	2005
Grade 4							
Below Basic	1.36	1.03	1.24	1.31	1.29	0.28	0.17
At or above Basic	1.36	1.03	1.24	1.31	1.29	0.28	0.17
At or above Proficient	1.19	1.00	0.90	1.05	1.00	0.31	0.20
At Advanced	0.40	0.25	0.32	0.32	0.28	0.12	0.11
Grade 8							
Below Basic	1.43	1.13	1.10	1.03	0.94	0.28	0.23
At or above Basic	1.43	1.13	1.10	1.03	0.94	0.28	0.23
At or above Proficient	1.06	0.97	1.12	0.99	0.83	0.27	0.23
At Advanced	0.33	0.38	0.55	0.45	0.39	0.15	0.11
Grade 12							
Below Basic	1.59	1.14	1.27	1.11	1.05	†	†
At or above Basic	1.59	1.14	1.27	1.11	1.05	†	†
At or above Proficient	0.92	0.75	1.05	0.86	0.93	†	†
At Advanced	0.30	0.26	0.32	0.29	0.34	†	†

† Not applicable.

¹ Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2005 Mathematics Assessments, previously unpublished tabulation (November 2005).

Mathematics Performance of Students in Grades 4 and 8

Table S13-3. Standard errors for the average mathematics score for 4th- and 8th-graders, by selected student and school characteristics: 1990 and 2005

Student or school characteristic	Grade 4		Grade 8	
	1990	2005	1990	2005
Total	0.9	0.1	1.3	0.2
Sex				
Male	1.2	0.2	1.6	0.2
Female	1.1	0.2	1.3	0.2
Race/ethnicity				
White	1.0	0.1	1.3	0.2
Black	1.8	0.3	2.7	0.4
Hispanic	2.2	0.3	4.3	0.4
Asian/Pacific Islander	†	0.7	†	0.9
American Indian	†	0.9	†	0.9
Parents' education				
Less than high school	†	†	2.0	0.5
High school diploma or equivalent	†	†	1.6	0.3
Some college	†	†	1.6	0.3
Bachelor's degree or higher	†	†	1.5	0.2
Location				
Central city	†	0.3	†	0.4
Urban fringe/large town	†	0.2	†	0.3
Rural/small town	†	0.3	†	0.4
Students in school eligible for free or reduced-price lunch				
10 percent or less	†	0.4	†	0.6
11–25 percent	†	0.3	†	0.5
26–50 percent	†	0.3	†	0.3
51–75 percent	†	0.3	†	0.4
More than 75 percent	†	0.3	†	0.6

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990 and 2005 Mathematics Assessments, previously unpublished tabulation (November 2005).

Mathematics Performance of Students in Grades 4 and 8

Table S13-4. Standard errors for the average mathematics score for public school 4th- and 8th-graders and change in score since 1992 and 1990, by state: 2005

State	Grade 4		Grade 8	
	Average score in 2005	Change from 1992 average score	Average score in 2005	Change from 1990 average score
United States	0.2	0.8	0.2	1.4
Alabama	0.9	1.8	1.5	1.9
Alaska	1.0	†	0.8	†
Arizona	1.1	1.5	1.1	1.7
Arkansas	0.9	1.3	1.2	1.5
California	0.6	1.7	0.6	1.4
Colorado	1.1	1.5	1.2	1.5
Connecticut	0.8	1.4	1.4	1.8
Delaware	0.5	0.9	0.6	1.1
District of Columbia	0.8	0.9	0.9	1.2
Florida	0.7	1.6	1.1	1.7
Georgia	1.0	1.6	1.1	1.7
Hawaii	0.8	1.6	0.7	1.0
Idaho	0.7	1.2	0.9	1.2
Illinois	1.0	†	1.1	2.0
Indiana	0.8	1.3	1.0	1.5
Iowa	0.7	1.2	0.9	1.4
Kansas	1.0	†	1.0	†
Kentucky	0.9	1.3	1.2	1.7
Louisiana	0.9	1.7	1.4	1.9
Maine	0.8	1.3	0.8	†
Maryland	1.0	1.6	1.1	1.8
Massachusetts	0.8	1.4	0.9	†
Michigan	1.2	2.1	1.5	1.9
Minnesota	1.0	1.3	1.2	1.5
Mississippi	0.9	1.4	1.2	†
Missouri	0.9	1.5	1.3	†
Montana	0.8	†	0.7	1.2
Nebraska	0.9	1.5	1.0	1.5
Nevada	0.8	†	0.8	†
New Hampshire	0.8	1.4	0.8	1.2
New Jersey	1.1	1.9	1.4	1.8
New Mexico	0.8	1.7	0.9	1.2
New York	0.9	1.5	0.9	1.7
North Carolina	0.9	1.4	0.9	1.4
North Dakota	0.5	0.9	0.6	1.4
Ohio	1.0	1.5	1.1	1.5
Oklahoma	1.0	1.4	1.0	1.7
Oregon	0.8	†	1.0	1.4
Pennsylvania	1.2	1.8	1.5	2.2
Rhode Island	0.9	1.8	0.8	1.0
South Carolina	0.9	1.4	0.9	†

See notes at end of table.

Mathematics Performance of Students in Grades 4 and 8

Table S13-4. Standard errors for the average mathematics score for public school 4th- and 8th-graders and change in score since 1992 and 1990, by state: 2005—Continued

State	Grade 4		Grade 8	
	Average score in 2005	Change from 1992 average score	Average score in 2005	Change from 1990 average score
South Dakota	0.5	†	0.6	†
Tennessee	1.2	1.8	1.1	†
Texas	0.6	1.3	0.6	1.5
Utah	0.8	1.2	0.7	†
Vermont	0.5	†	0.7	†
Virginia	0.9	1.6	1.1	1.9
Washington	0.9	†	1.0	†
West Virginia	0.7	1.3	1.0	1.4
Wisconsin	0.9	1.4	1.1	1.7
Wyoming	0.6	1.1	0.7	1.0

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, and 2005 Mathematics Assessments, previously unpublished tabulation (November 2005).